

Science Mission Requirements

Mission Readiness Review

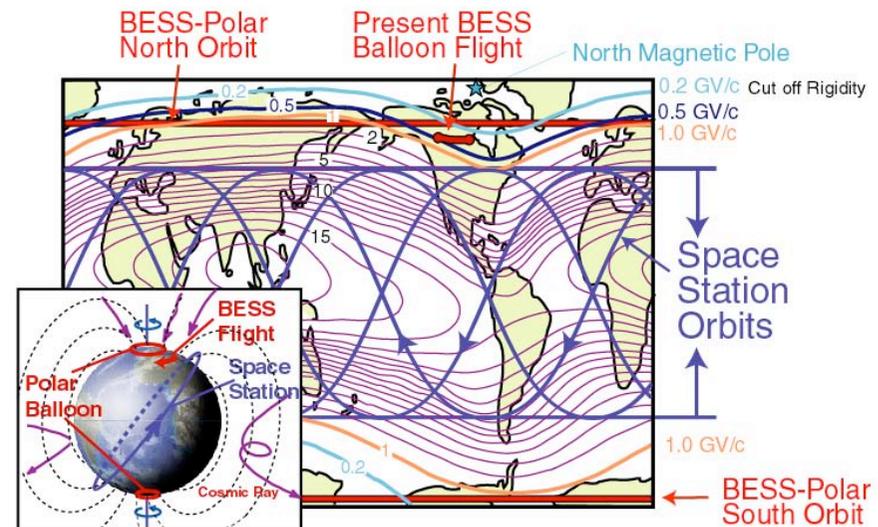
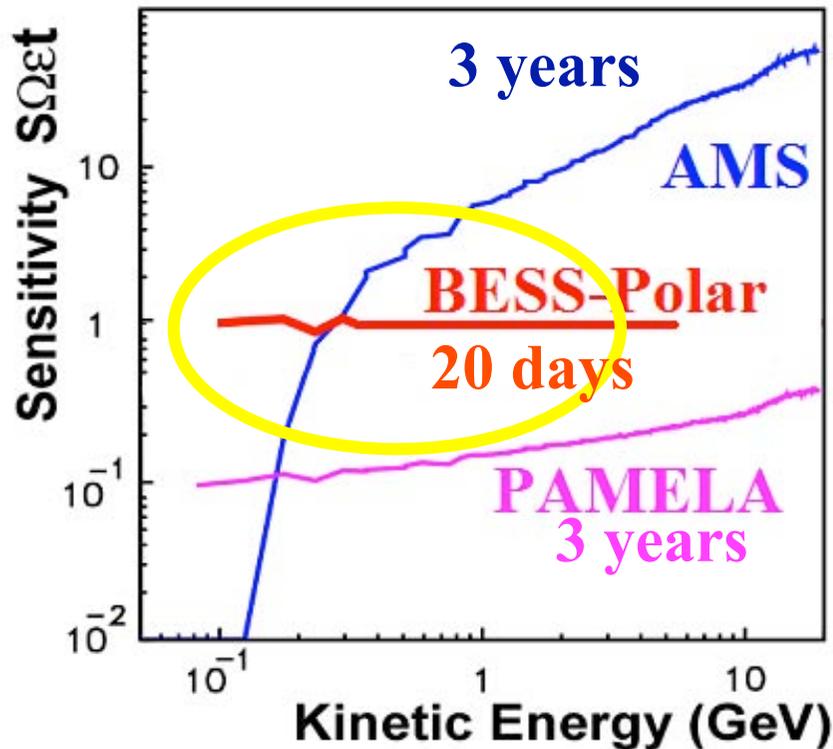
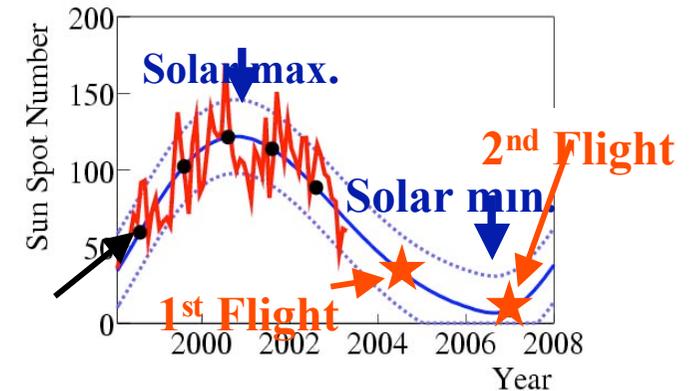
Sept. 8, 2004

Akira Yamamoto for the

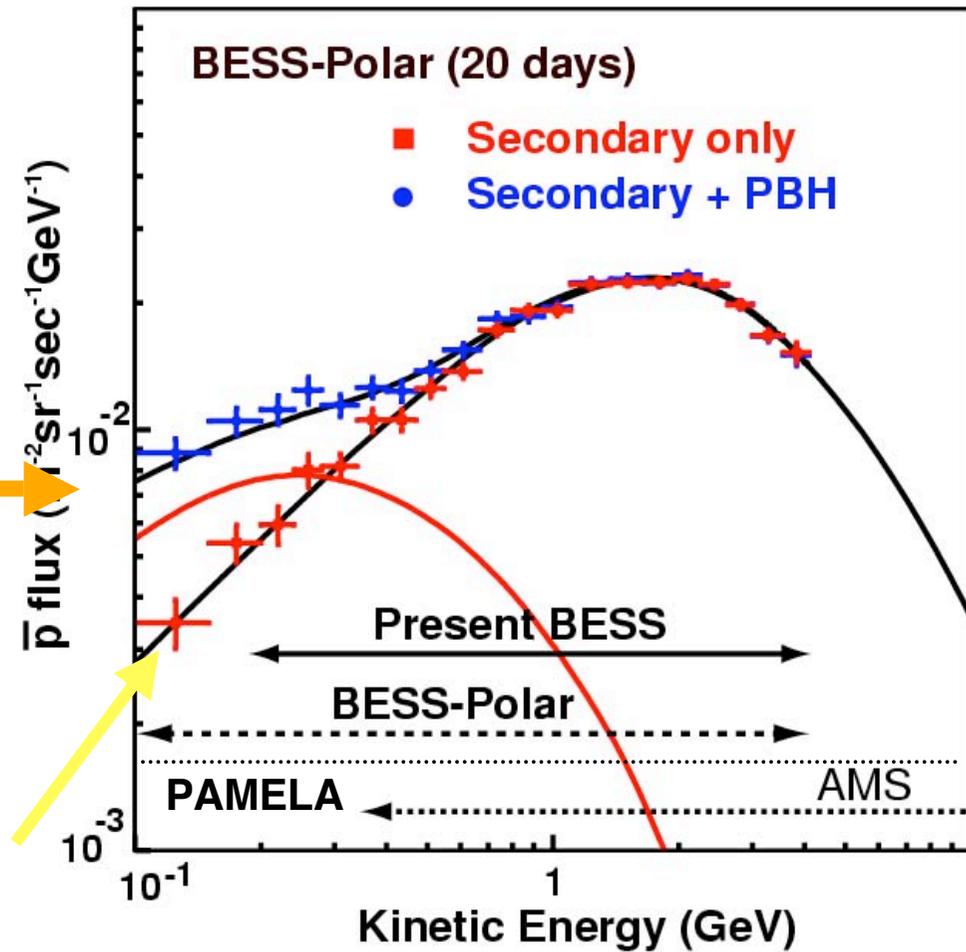
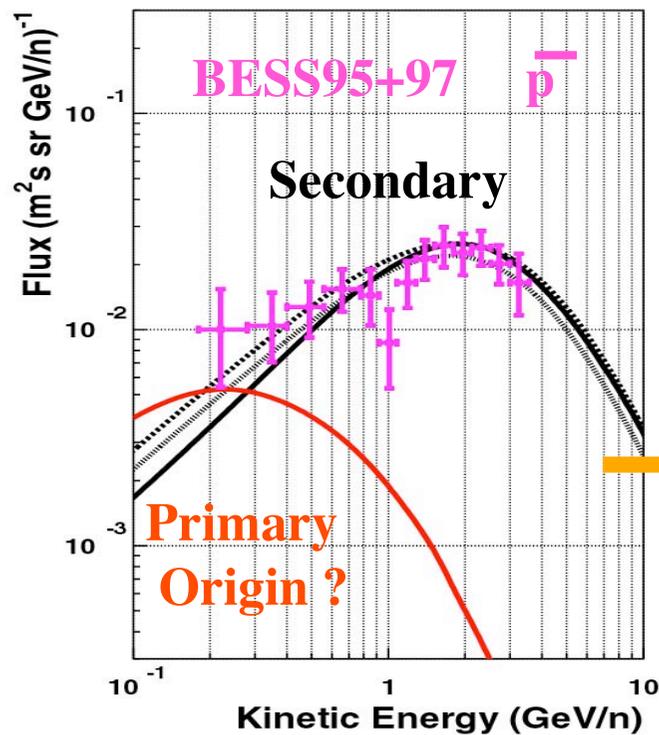
BESS-Polar Collaboration

BESS-Polar

- **Unique and ideal for low energy particles**
 - Stay in **low magnetic cut-off** regions
 - Highest sensitivity at Solar Minimum,
 - Complementary with Satellite Programs,



Precise measurements of Antiprotons with BESS-Polar



Spectrometer sensitive down to 0.1 GeV

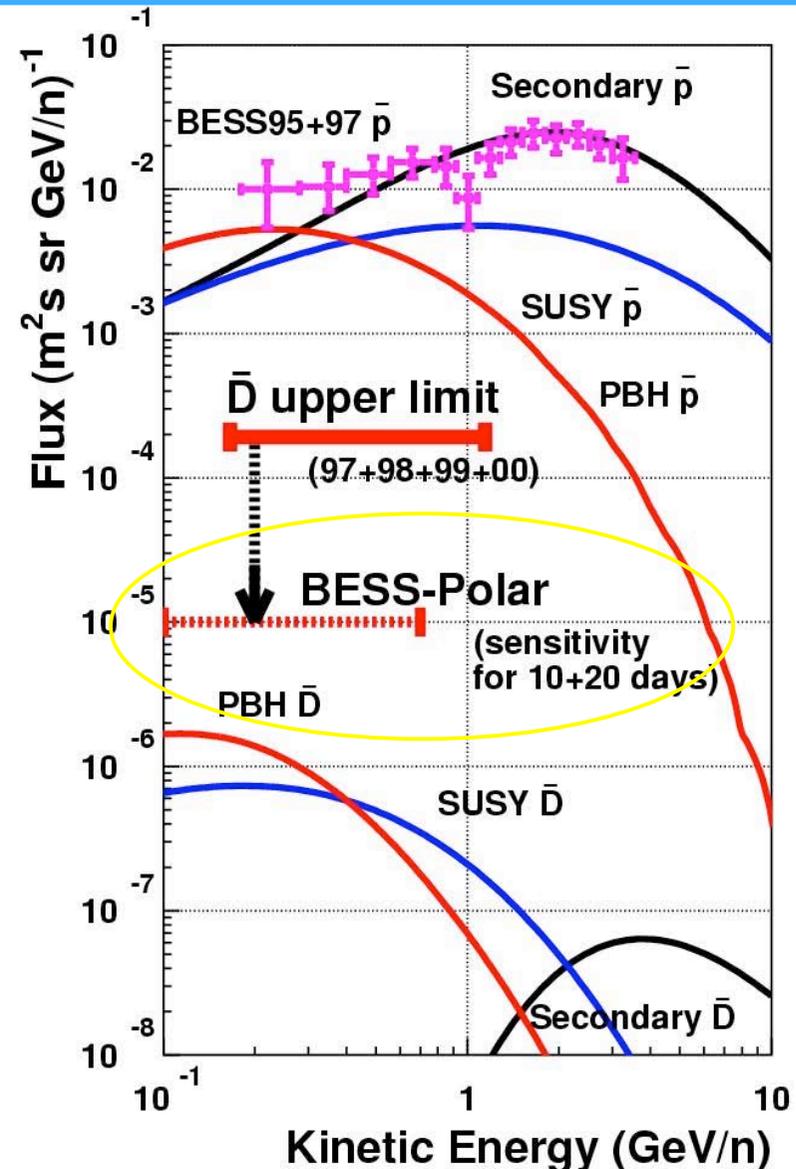
Search for Antideuteron

Sensitivity:

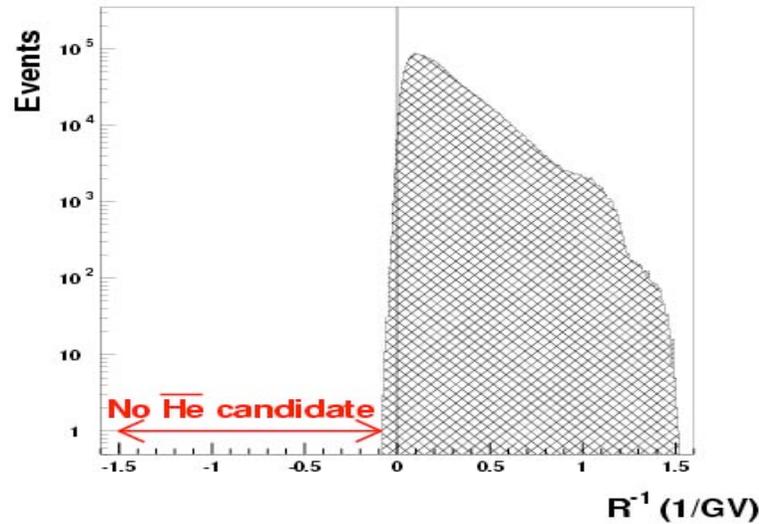
$$1 \times 10^{-5} \text{ (m}^2\text{s.sr.GeV/n)}^{-1}$$

with assuming two flights for
10 + 20 days

nearing PBH sensitivity!



Search for Antihelium



BESS93~00

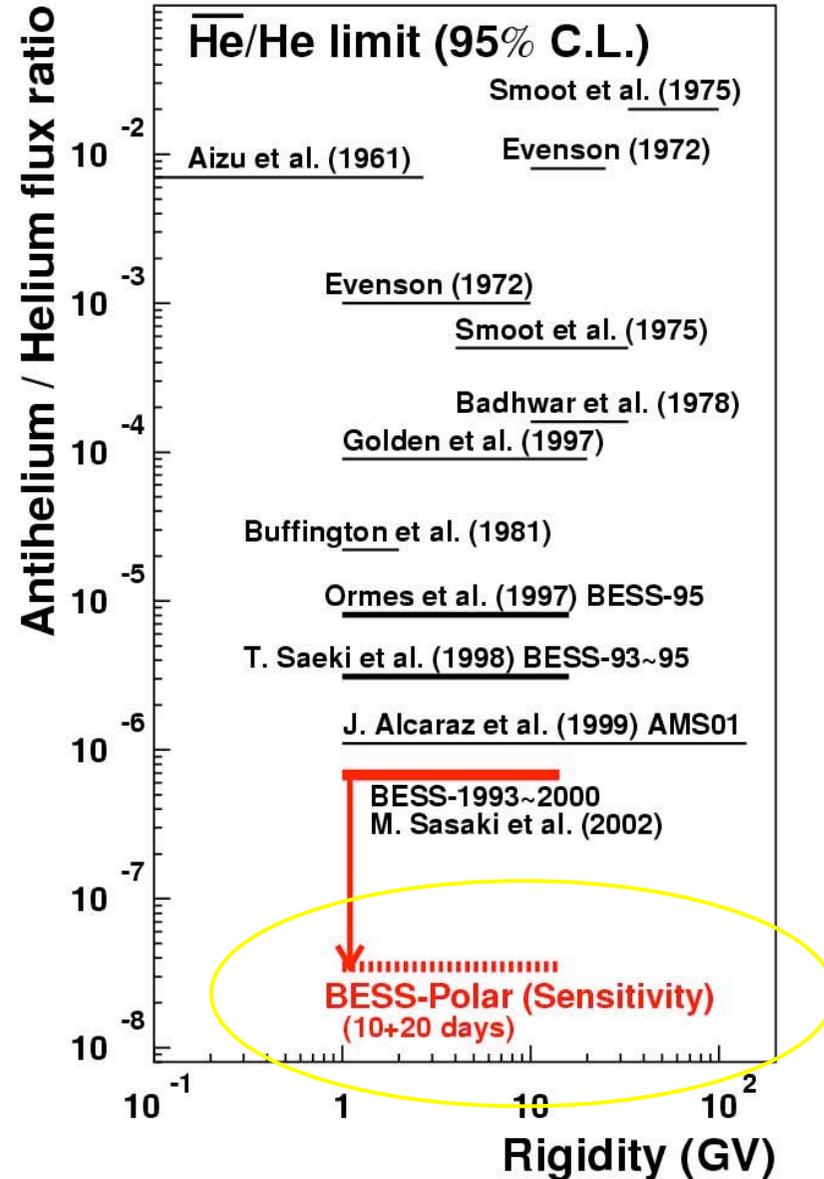
Upper Limit:

$$\bar{\text{He}}/\text{He}: 7 \times 10^{-7}$$

BESS-Polar:

Sensitivity:

$$\bar{\text{He}}/\text{He}: 3 \times 10^{-8} \text{ (30 days)}$$



Requirements for the First LDB Flight

- **Launch time:**
 - As early as possible to maximize the stable flight condition and the chance of the safe recovery.
- **Flight condition:**

	(minimum)	(desired)
– Altitude:	> 110 kft	> 120 kft
– Duration:	> 5 days	> 10 days
– Stability:	no requirement	
– Orientation:	no requirement, but	

Recovery requirements

- **First** access to:
 - Payload safety (magnetic field, cryogen, and power),
 - Recover the **science data**, and check,
- **Second and further** access to:
 - Disassemble detectors and magnet,
 - Safe recovery of the payload with various components,
- **Recovery**
 - Minimum disassembly in recovery by using Helicopter.
 - A BESS crew to participate the recovery for appropriate disassembly work.

Appendix

BESS Polar

Long Duration Flights in Antarctica

Aims at Measure/Search

- **Low Energy Antiprotons;**
 - 10^3 at < 1 GeV, 10^4 at < 4 GeV
- **Antidueteron Search w/ Sensitivity**
 - $1 \times 10^{-5} (\text{m}^2 \cdot \text{s} \cdot \text{sr} \cdot \text{GeV}/n)^{-1}$
- **Antihelium Search w/ Sensitivity**
 - $\bar{\text{He}}/\text{He}$ ratio: 3×10^{-8}
- **Precise Cosmic-ray Observations**

